

Than Clauses as Embedded Questions

Nicholas Fleisher, University of Wisconsin–Milwaukee

Quantificational subjects of comparative *than* clauses often appear to take scope at the level of the matrix clause, as in (1a). This behavior is syntactically confounding, given finite clauses' status as scope islands, and understanding it has become a major focus of the comparatives literature in the past 15 years.

Here I propose a novel analysis of English clausal comparatives in which the *than* clause is treated as an embedded question. The analysis is inspired by a large number of syntactic and semantic parallels between *than* clauses and questions embedded under responsive embedders like *know*. Some of these parallels were noticed by Moltmann (1992) and Moltmann & Szabolcsi (1994); others are novel; all of them have been overlooked in the recent comparatives literature. I propose that the apparent exceptional scopal behavior of *than*-clause-internal quantifiers is an epiphenomenon of quantificational variability (QV), following a suggestion of Sharvit (2002) for embedded questions.

First, both *than* clauses and embedded questions show the same surprising matrix-scope-like behavior for embedded subjects (Moltmann 1992:226ff.). This yields the well-known pair-list reading in the embedded question case.

- (1) a. John is taller than every girl is. \rightsquigarrow 'for every girl *g*, John is taller than *g* is'
b. John knows how tall every girl is. \rightsquigarrow 'for every girl *g*, John knows how tall *g* is'

Second, in both constructions it is possible for the matrix subject to be quantificationally dependent on the embedded subject; i.e. an inverse scope reading appears available (Moltmann & Szabolcsi 1994).

- (2) a. Some boy or other is less than six inches taller than every girl is. (OK: *every* > *some*)
b. Some boy or other knows how tall every girl is. (OK: *every* > *some*)

Third, the same range of embedded subjects displays this surprising behavior in both constructions. In particular, negative existentials with *no* are out (Szabolcsi 1997; Dotlačil & Nouwen 2016).

- (3) a. John is taller than no girl is. \rightsquigarrow #'for no girl *g*, John is taller than *g* is'
b. John knows how tall no girl is. \rightsquigarrow #'for no girl *g*, John knows how tall *g* is'

Finally, both *than* clauses and embedded questions exhibit QV effects. While QV in embedded questions is well known, to my knowledge it has not been previously reported in *than* clauses.

- (4) a. For the most part, some boy or other is less than six inches taller than every girl is.
 \rightsquigarrow 'for most girls *g*, some boy is less than six inches taller than *g* is'
b. For the most part, some boy or other knows how tall every girl is.
 \rightsquigarrow 'for most girls *g*, some boy knows how tall *g* is'

The parallels between *than* clauses and embedded questions are, I suggest, more than merely suggestive. I propose that we treat *than* clauses on a par with embedded questions. Specifically, I claim that the *than* clause denotes a degree question and serves as the restriction of a quantificational adverb. I adopt the QV framework of Beck & Sharvit (2002; based in turn on Lahiri 2002), in which QV involves quantification over subquestions of the question-restriction. A formal innovation here is the degree-answer operator ANS_d , defined in (5); I propose that this is the semantic contribution of *than*. The analysis of (4a) is sketched in (6) and explicated immediately below.

- (5) $\text{ANS}_d(w)(Q) = \text{id}[\text{ABST}(Q)(d) = \text{MAXINF}(w)(Q)]$, where
- $\text{ABST}(Q)$ is Q 's abstract (in the sense of George 2011), and
 - $\text{MAXINF}(w)(Q)$ yields the strongest true answer to Q in w (cf. Beck & Rullmann 1999)
- (6) **most** $_Q[Q \in \text{DIV}(\llbracket wh_i \text{ every girl is } t_i\text{-tall} \rrbracket)]$ [some boy is <6in taller than $\text{ANS}_d(w)(Q)$]
- $\text{DIV}(\llbracket wh_i \text{ every girl is } t_i\text{-tall} \rrbracket) = \{\text{how tall is Ann?}, \text{how tall is Becca?}, \dots\}$
 - $\text{ABST}(\text{how tall is Ann?}) = \lambda d \lambda w. \text{tall}(w)(\text{Ann}, d)$
 - $\text{MAXINF}(w)(\text{how tall is Ann?})$
 $= \text{MAXINF}(w)(\lambda p. \exists d[p = \lambda w'. \text{tall}(w')(\text{Ann}, d)])$
 $= \lambda w'. \text{tall}(w')(\text{Ann}, d_{A,w})$ (where $d_{A,w}$ is Ann's maximal height in w)
 - $\text{ANS}_d(w)(\text{how tall is Ann?})$
 $= \text{id}[\text{ABST}(\text{how tall is Ann?})(d) = \text{MAXINF}(w)(\text{how tall is Ann?})]$
 $= \text{id}[\lambda w. \text{tall}(w)(\text{Ann}, d) = \lambda w'. \text{tall}(w')(\text{Ann}, d_{A,w})]$
 $= d_{A,w}$

The QV reading of (4a) (evaluated at w) has the LF in (6). The *than* clause denotes a degree question (equivalent to $\llbracket \text{how tall is every girl?} \rrbracket$) that restricts the Q-adverbial. Quantification is over logically independent subquestions of the *than*-clause question, as delivered by the DIV operator (Beck & Sharvit 2002; Sharvit 2002). A salient such division is shown in (6a). The question abstract of the subquestion *how tall is Ann?* is shown in (6b), and its maximally informative true answer in w is shown in (6c). With these two bits of information, we calculate the value of $\text{ANS}_d(w)$ for this subquestion as in (6d): Ann's (maximal) height in w . The nuclear scope will verify this value of Q iff some boy is less than six inches taller than Ann.

Apparent wide scope for the *than*-clause-internal quantifier now becomes an epiphenomenon of quantification over subquestions, as Sharvit (2002) proposes for embedded questions. Since DIV returns a subquestion for each girl in the domain, quantification over Q is a proxy for quantification over the girls. When there is no overt adverb, a default universal gives the *than*-clause subject apparent widest scope, as in (1). When the matrix subject stays low, we get apparent scope inversion, as in (2). When the *than*-clause subject precludes a licit division into subquestions, we get infelicity, as in (3).

Could we quantify over degrees instead of subquestions? Dotlačil & Nouwen (2016) have the *than* clause denote a degree plurality, whose part/whole structure makes it a good candidate to restrict the Q-adverbial. Unfortunately we encounter a proportion problem. Imagine that there are 10 girls, of whom 7 are the same height; 1 boy who is less than six inches taller than those 7 girls; and no boy who is less than six inches taller than any other girl. (4a) is intuitively true in this scenario. The *than*-clause degree plurality, though, contains just 4 atomic degrees (1 for the 7 girls, 3 for the others), only one of which verifies the nuclear scope. Quantification over degrees is not a successful proxy for quantification over the girls. Moreover, the cumulative readings that Dotlačil & Nouwen (2016) identify for clausal comparatives—a motivation for the degree plurality treatment—are paralleled by cumulative readings with embedded questions (Lahiri 2002; Beck & Sharvit 2002).

The syntactic parallels between *than* clauses and embedded questions have been known since Chomsky (1977). Their semantic parallels, by contrast, have been largely forgotten since Moltmann and Szabolcsi's work in the early 1990s. I have presented novel evidence that the syntactic and semantic affinities between the two constructions are even more thoroughgoing than that work suggested. I propose that this connection is the key to understanding the behavior of *than*-clause-internal quantifiers, one of the central mysteries of the English comparative.

References

- Beck, Sigrid & Hotze Rullmann. 1999. A flexible approach to exhaustivity in questions. *Natural Language Semantics* 7. 249–298.
- Beck, Sigrid & Yael Sharvit. 2002. Pluralities of questions. *Journal of Semantics* 19. 105–157.
- Chomsky, Noam. 1977. On *wh*-movement. In Peter W. Culicover, Thomas Wasow & Adrian Akmajian (eds.), *Formal syntax*, 71–132. New York: Academic Press.
- Dotlačil, Jakub & Rick Nouwen. 2016. The comparative and degree pluralities. *Natural Language Semantics* 24. 45–78. doi:10.1007/s11050-015-9119-7.
- George, Benjamin Ross. 2011. *Question embedding and the semantics of answers*: UCLA dissertation.
- Lahiri, Utpal. 2002. *Questions and answers in embedded contexts*. Oxford: Oxford University Press.
- Moltmann, Friederike. 1992. *Coordination and comparatives*: MIT dissertation.
- Moltmann, Friederike & Anna Szabolcsi. 1994. Scope interactions with pair-list readings. In *Proceedings of NELS 24*, Amherst: GLSA.
- Sharvit, Yael. 2002. Embedded quantifiers in *which*- and *whether*-questions. In Brendan Jackson (ed.), *Proceedings of SALT XII*, 266–285. Ithaca: Cornell University. doi:10.3765/salt.v12i0.2863.
- Szabolcsi, Anna. 1997. Quantifiers in pair-list readings. In Anna Szabolcsi (ed.), *Ways of scope taking*, 311–347. Dordrecht: Kluwer.